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LTP Learning Technologies Project Bulletin

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News Bytes

Burke Baker Planetarium Has Virtual Trips to Milky Way and Beyond

For the last 34 years, visitors to the Burke Baker Planetarium at the Houston Museum of Natural Science (HMNS) have gazed upward at a majestic but peaceful starfield. The images were grand, but the heavens didn't move. On December 11, all that changed when space travel became a reality for visitors to the newly designed planetarium. Through state-of-the-art, high-resolution video technology, they can now embark on immersive space journeys which showcase the universe in an entirely new and realistic light.

Visitors to the planetarium are immersed in space, flying through the cosmos at 150 megabytes per second as full-color moving planets, stars, meteors, solar systems, and entire galaxies zoom past. Clearly, the planetarium experience has been changed forever.

Imagine sitting in the dark, chair tilted back, while solar systems whirl around. The new dome will feature spectacular space images—none of which have ever been seen like this before—like the Eagle Nebula, with its huge columns of gas and dust 6 trillion miles long. Planetarium audiences will be the first in the world to fly through star clusters and clouds captured by the Hubble Space Telescope.

This moving planetarium experience is made possible by an advanced video system, known as SkyVision, which has been developed by Sky Skan, a New Hampshire-based company that is a world leader in multimedia services for domed theatres.

Sky Skan's new panoramic video application allows any image to be projected on the curved, 360-degree surface of the dome, correcting geometric errors so that viewers feel as if they're traveling through space. The system is also capable of producing one of the highest resolutions known today. SkyVision will display real-time space images in the planetarium. As a result, visitors will be among the first to see the latest images from the Hubble Space Telescope—clearly, in color, and in motion.

An interactive multimedia server controls all images projected on the planetarium dome. The digital library includes thousands of images, from alien worlds to black holes. Four wide-format video projectors, each supplying images to one section of the dome, interact with each other so that the viewer sees one huge, seamless image. The system insures that the images merge together flawlessly, even when flying through our solar system or a distant galaxy.

"The result is spectacular," commented Dr. Carolyn Sumners, director of astronomy at HMNS. "Whether audiences are immersed in the latest Hubble Space Telescope deep-space images or a space station fly-through with real-time feeds from NASA, they'll never think of a visit to the planetarium in the same way again. Our goal, of course, is to involve our visitors, so that no matter what their age, they learn more about the universe around them. The new planetarium definitely accomplishes that."

In addition to its entirely new show system, the planetarium has been redesigned to look and feel more like a space theatre.

The entire floor has been ramped so that the seats are tilted, and the old dome has been replaced with a sleek, seamless one. Show projectors have been mounted into the architecture. The planetarium sound system has been modified and now features more speakers, more amps, and more subwoofers. More than 3,000 watts of digital sound will fill the theatre.

The re-opening of the Burke Baker Planetarium to the public on December 11 marked yet another milestone in the museum's commitment to education in the physical and natural sciences. Opened in 1964, the planetarium was the first phase of construction of the new museum. In the 34 years since then, millions of visitors have explored the heavens.

The Friedkin Foundation, NationsBank, the Houston Museum of Natural Science Guild, and Rice University, through NASA grant NCC5-311, have generously underwritten renovations to the Burke Baker Planetarium.

Holiday Hello from the LTP Coordinator

Phyllis Griggs
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Universal greetings to the Learning Technologies family! I have enjoyed my first six months at RSPAC and the opportunity to get to know so many of the Learning Technologies individuals. Many of you have made my job quite enjoyable, and I thank you for that.

RSPAC looks forward to helping all of the Learning Technologies projects meet their goals in 1999. If your project needs support in any way–computer programming, graphic art, or publicity–please contact us. That's why we're here!

Again, best wishes for a very merry holiday season from all of RSPAC to all of NASA's Learning Technologies project groups.

Nothin' but Net

A New Graphic Format? PNG Now Taking Off

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A new graphic format? Not really. It's the Portable Network Graphic (PNG) and it's becoming very well-known very quickly.

The PNG format got its start in 1977 when Jacob Ziv and Abraham Lempel created two lossless data compression algorithms called LZ77 and LZ78. In 1983, Terry Welch developed a variant of LZ78 and named it LZW. At around the same time, CompuServe was designing a new portable compressed image format which became known as the GIF, designed to use the LZW compression algorithm. With the World Wide Web growing in popularity, the GIF format became the image standard.

The LZW algorithm had been patented by Unisys, the company Welch worked for, in 1985. CompuServe was fighting with Welch and Unisys over the patent of the LZW algorithm. The true beginning of the PNG format was in 1994, when an informal Internet group led by Thomas Boutell decided to design a replacement for the GIF format. The new format would be better, smaller, more extensible, and FREE.

What followed was the creation of the PNG format, first released on January 4, 1995. The format was fine-tuned and released several more times with added features. In March 1995 a complete working draft was released. In July 1996, the creators of the PNG format filed for a W3C (World Wide Web Consortium) recommendation. In October 1996, the PNG format received the first recommendation ever handed out by the World Wide Web Consortium.

The PNG format has many advantages (when compared with other image formats) and a couple of disadvantages (in terms of Web browsers). The disadvantages are limited, but they may be difficult to overcome.

The advantages:

PNG images have more colors. They are not limited to 256 colors like the GIF, or even 24-bit true color. PNG supports up to 48-bit true color.

PNG images are 10-30 percent smaller than those in GIF format; often 40-50 percent smaller.

PNG images can be corrected to account for the display inconsistencies that exist between platforms with Gamma Correction.

Alpha-Channel Transparency allows PNGs to have several transparent colors instead of just one.

PNGs use a lossless compression format.

True-color images can be up to 48 bits.

Gray-scale images can be up to 16 bits.

Palette-mapped images can be up to 256 colors.

Streamability and progressive display are included.

PNGs are completely hardware- and platform-independent.

PNG has a royalty-free license.

There is full year 2000 (Y2K) support.

Its signature can detect the most common types of file corruption.

There is a two-dimensional interlacing scheme.

The disadvantages:

Only a few older browsers can view PNG images.

Netscape and Microsoft did not have the ability to view PNG images until MSN 4 and Netscape Communicator 4.04.

PNGs cannot be animated.

Because of the disadvantages of the PNG it got a slow start, but all new browsers have native support for the PNG format, (they do not require an extensions plug-in). Plug-ins are available for some older browsers. The creators of the PNG are also working on a Multiple-image Network Graphic (MNG) format (more about MNGs in future editions of the *LTP Bulletin*).

PNGs are one of the standards for the World Wide Web. Most new and some old image editing software and all new browsers support PNGs. Since PNGs are smaller, they allow faster loading of Web pages and higher-quality images. PNGs are a very promising tool in the world of Web design.

To learn more about PNGs, go to the PNG homepage at **http://www.cdrom.com/pub/png**. To learn more about the plug-ins, go to **http://speedy.siegelgale.com/solutions/png_index.html**.

In the Spotlight

Public Television Uses Grant to Help Disadvantaged Populations

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Mississippi Educational Television (METV) and Louisiana Public Broadcasting are using the funds from a Challenge Grant for Technology in Education to develop technology-based curricula for grades K-6. Lesson plans developed by the John C. Stennis Space Center through the Learning Technologies Project will be used to help design the curricula.

Louisiana Public Broadcasting and METV have initiated a five-year project that involves five other public broadcasting stations and 21 public schools from across the country.

The goal of the project is to develop a set of technology-based curricula in core areas—in this case remote sensing. The project will target disadvantaged urban and rural populations.

During the summer, NASA's Educator Resource Center at the Stennis Space Center hired six teachers to assist with the development of a remote sensing Web site. Each teacher also designed 10 remote sensing-based lesson plans for inclusion on the Web site.

Teachers from the schools participating in the project will visit the Stennis Space Center in March to attend technology workshops and interact with the teachers who wrote the lesson plans.

If you would like to be on the LTP Bulletin mailing list, please send e-mail to Scott Gillespie at: sgillespie@rspac.ivv.nasa.gov, or write to: BDM/RSPAC, 100 University Drive, Fairmont, WV 26554. Phone: (304) 367-8324, fax: (304) 367-8211.

News Bytes (cont.)

New Applets Featured in RSPAC's JavaShop

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If the new year finds your Learning Technologies Project group looking for a way to make your Web site more attractive, fun, interactive, and memorable to visitors, try adding some of the many applets available in RSPAC's JavaShop.

Ten different tools are now featured in JavaShop, an online warehouse of applets located on the Developers' Workshop at **http://developers.ivv.nasa.gov/tech/javashop.**

Brought to you by RSPAC's Web programming team, the JavaShop applets provide LTP groups with exciting new Java technology that's easily customized and incorporated into a Web site. RSPAC develops new applets frequently, so visit the Developers' Workshop each month to find out what's new. Among the JavaShop productions now available to LTP groups:

Side Scroller Applet
This applet scrolls regular and hyperlinked text horizontally.
Drop Down Menu Applet
The drop down menu applet provides an easy way to navigate a site.
Crossword Puzzle
All you need are the words and clues and this applet will create the puzzles.
The Scroller
The Scroller enables you to provide scrolling text containing HTML links.
Java Hangman
A fun and educational game for all ages.
Java Animator
A user-controlled slide show applet.
Headline Scroller
Scroll through a list of headlines.
Wordsearch
Search for hidden words from a large grid.
Line Graph
Draw a line graph to illustrate your Web articles.
Pie Chart
Like line graphs, pie charts are great for showing statistics, progress, etc.

After using any of the JavaShop productions, please let their creators know what you liked and disliked, or about features you would like to see added. Send comments to JavaShop@rspac.ivv.nasa.gov.

Stennis' *From a Distance* Web Site Now Online

Stennis Space Center's newest Web site, *From a Distance,* is now online at **http://education.ssc.nasa.gov/ltp**.

From a Distance was developed and is maintained by the John C. Stennis Space Center, located in southern Mississippi.

The Web site includes lesson plans on remote sensing for grades K-3, 4-8, and 9-12. These lesson plans are organized by grade level and subject area, and teachers are able to either modify the plans or implement them verbatim in a manner that will accomplish the teacher's specific goals and objectives.

Lesson plans for *From a Distance* were developed by the following teachers: Andy Allred, Lillie Middle School, Union Parish, Louisiana; Claudia R. Freeman, Pass Road Elementary School, Gulfport, Mississippi; Cheryl W. Gerard, St. Tammany Parish, Covington, Louisiana; John Massengale, Poplarville High School, Poplarville, Mississippi; Kathy Roberts, Long Beach High School, Long Beach, Mississippi; Ann Vanderbeek, Hancock County Schools, Hancock County, Mississippi.

This bulletin will also be available in Adobe Acrobat format on the Developers' Workshop Web site at: **http://developers.ivv.nasa.gov/collab/pubs/bulletin/**

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